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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/616,364	07/13/2000	Mineharu Uchiyama	PM 271598 T4YK-00S0603	6820

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EXAMINER	
BATTAGLIA, MICHAEL V	
ART UNIT	**PAPER NUMBER**
2652	

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/616,364	UCHIYAMA, MINEHARU	
	Examiner	Art Unit	
	Michael V Battaglia	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-9,19,27-32 and 36-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27-32 and 36-38* is/are allowed.

6)☒ Claim(s) *6-9,19 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 19 is objected to because of the following informalities:

a. On line 4 of claim 19, replacing "expressions" with -expression-- is suggested.

b. On line 5 of claim 19, removing "(DVD)" and "(CD)" is suggested because the first and second disks have not been claimed as a DVD and CD, respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 9/6, 19 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 6,301,216) in view of Toyoda (JP 11-185282) and further in view of Ohnishi et al (hereafter Ohnishi) (US 6,507,009) and further in view of Mori et al (hereafter Mori) (US 5,717,674) and further in view of Akiyama (US 6,240,053). It is noted that the citations of the detailed description of Toyoda reference the translation provided by the Japanese Patent Office web site.

In regard to claim 6, Takahashi discloses an optical head device (Fig. 4) comprising: a first light source (Fig. 4, element 45) for emitting a first light beam of a first wavelength; a second light source (Fig. 4, element 44) which emits a second light beam of a second wavelength which is longer

than the first wavelength (Col. 5, line 47-Col. 6, line 2); a single block (Fig. 4, element 47) wherein the first and second light sources are aligned thereon; and an objective lens (Fig. 4, element 38) which causes the light beams from the first light source and second light source to converge on a recording medium (Fig. 4, element 39); wherein the objective lens, the first light source and the second light source are disposed such that an optical of the second light beam substantially coincides with an optical axis of the objective lens (Fig. 4, optical axis of second light beam after deflection from deflective prism (Fig. 4, element 37) on path to the objective lens), and an optical axis of the first light beam is slanted from the optical axis of the objective lens (Fig. 4, optical axis of first light beam after emission on path to beam shaping prism (Fig. 4, element 31)). Takahashi does not disclose that the optical head device comprises a diffraction grating having first and second surfaces, the objective lens being designed to give priority to application of the first light beam to the recording medium, wherein the first surface of the diffraction grating has a first order diffraction efficiency of almost zero for the first light beam forwarded from the first light source and emits the first-order diffraction light for the second light beam forwarded from the second light source, and the second surface of the diffraction grating is designed to realize a differential push-pull method of sensing a tracking error sense signal, and wherein the first and second surfaces of the diffraction grating do not diffract returned light from the recording medium.

Toyoda discloses an optical head device comprising: a first light source (Fig. 2, element 21b) for emitting a first light beam of a first wavelength; a second light source (Fig. 2, element 21a) which emits a second light beam of a second wavelength which is longer than the first wavelength (Paragraph [0023], lines 4-7); a single block wherein the first and the second light source are aligned thereon (Fig. 2, element 21); and a diffraction grating (Figs. 2 and 3, element 22) having a first surface (Fig. 3, element 22b), wherein the first surface of the of the diffraction grating has a

first order diffraction efficiency of almost zero for the first light beam forwarded from the first light source and emits the first-order diffraction light for the second light beam forwarded from the second light source (Paragraph [0024], lines 1-5), and wherein the first surface of the diffraction grating does not diffract returned light from a recording medium (Fig. 2, element 11). Toyoda teaches that by using this arrangement, a tracking error signal is detected by the 3-spot method and the record signal of a recording medium is correctly reproduced when using the second light beam (Paragraph [0028]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the optical head device of Takahashi the diffraction grating having the first surface of Toyoda, the motivation being to detect a tracking error signal using the 3-spot method and correctly reproduce the record signal of a recording medium when using the second light beam of Takahashi.

Ohnishi discloses an optical head device comprising: a first light source (Fig. 10, element 1a) for emitting a first light beam of a first wavelength; a second light source (Fig. 10, element 1b) which emits a second light beam of a second wavelength which is longer than the first wavelength (Col. 10, lines 2-8); and a diffraction grating (Fig. 10, element 2a) having a surface, wherein the surface of the diffraction grating does not diffract returned light from a recording medium (Fig. 10, element 7). The surface of the diffraction grating diffracts the first light beam into three beams (Col. 10, lines 11-14), thereby enabling use of a differential push-pull method to generate a tracking error signal (Col. 2, lines 25-27 and Col. 14, lines 2-5). Ohnishi teaches that the differential push-pull method is beneficial because it cancels an offset caused by displacement of the objective lens (Col. 2, lines 22-31). It is noted that surface of the diffraction grating of Ohishi does not diffract the second light beam (Fig. 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include, in the optical head device of Takahashi, the diffraction grating having a surface of Ohnishi, the motivation being to facilitate generation of a tracking error signal using the differential push-pull method when using the first light beam of Takahashi and to thereby, cancel an offset caused by displacement of the objective lens.

Mori discloses forming the surfaces of two diffracting devices as part of one optical element (Col. 12, lines 33-36). Mori teaches that by doing so, the relative positions are accurately set and optical adjustment is simplified (Col. 3, line 66-Col. 4, line 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first surface of the diffraction grating of Toyoda and the surface of the diffraction grating of Ohnishi in the optical head device of Takahashi as one diffraction grating having first and second surfaces as suggested by Mori, the motivation being to accurately set the relative positions of the surfaces and simplify optical adjustment. It is noted that the surface of Ohnishi is the second surface of the diffraction grating.

Akiyama discloses an optical head device (Fig. 11) comprising: a first light source (Fig. 11, element 11) for emitting a first light beam of a first wavelength; a second light source (Fig. 11, element 12) which emits a second light beam of a second wavelength which is longer than the first wavelength (Col. 23, lines 60-67); and an objective lens (Figs. 10A, 10B and 11, element 6) which causes the light beams from the first light source and second light source to converge on a recording medium (Fig. 11, elements 7 and 8 and Col. 23, lines 19-21), the objective lens being designed to give priority to the application of the first light beam to the recording medium (Col. 23, lines 13-15). Akiyama teaches that good characteristics for reproducing, recording or erasing of information with the first light beam and the second light beam are achieved while using the

objective lens designed to give priority to the application of the first light beam to the recording medium in a shared manner (Col. 23, lines 54-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the objective lens of Takahashi to be designed to give priority to the application of the first light beam to the recording medium as suggested by Akiyama, the motivation being to achieve good characteristics for reproducing, recording or erasing of information with the first light beam and the second light beam while using the objective lens in a shared manner.

In regard to claim 9/6, the underlying material of Mori (Fig. 10) on which the surfaces (Fig. 10, elements 12 and 13) are integrally formed is interpreted as a substrate. Therefore, in the optical head device of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama, the first and second surfaces of the diffraction grating are formed integrally on a substrate.

In regard to claims 19 and 39, Takahashi discloses that the recording medium (Fig. 4, element 39) of the optical head device includes a first disk to be read from when said first light source is used (Col. 5, lines 51-54) and a second disk to be read from when said second light source is used (Col. 2, lines 54-56 and Col. 5, lines 26-27). In regard to claim 19, Takahashi does not disclose that said recording medium satisfies the following expressions; t1 (DVD) < t2 (CD) where t1 is the substrate thickness of the first disk and t2 is the substrate thickness of the second disk. In regard to claim 39, Takahashi does not disclose that the recording medium has a plurality of tracks. It is noted that Takahashi discloses that the first disk is a high density disk (Col. 10, lines 51-54) and that first disk and second disk have different recording capacities (Col. 2, lines 54-56) but does not specify the exact type of each of the first and second disk.

Ohnishi discloses a recording medium (Fig. 10, element 7) having a plurality of tracks (Figs. 11(a) and 11(b)) that includes a first disk to be read from when the first light source is used (Col. 10, lines 2-5) and a second disk to be read from when the second light source is used (Col. 10, lines 5-8) and satisfies the following expression; t1 (DVD) < t2 (CD) where t1 is the substrate thickness of the first disk and t2 is the substrate thickness of the second disk (Col. 10, lines 56-63). It is noted that the first disk of Ohnishi is a DVD and the second disk is a CD and that Ohnishi discloses that a DVD is a high density disk having a different recording capacity than a CD (Col. 10, lines 2-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the first disk of Takahashi to be a DVD and for the second disk of Takahashi to be a CD as suggested by Ohnishi, the motivation being for the first and second disks of Takahashi to be optical discs known in the art having different recording capacities. It is noted that a DVD first disk and CD second disk satisfy the substrate thickness expression as noted by Ohnishi above and that both DVD's and CD's have a plurality of tracks as seen by Fig. 11 of Ohnishi.

3. Claims 7 and 9/7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama as applied to claim 6 above, and further in view of Katsuma (US 6,094,308).

Toyoda does not disclose the depth h01 of the grating groove of said first surface of the diffraction grating in the optical head device of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama is expressed by h01 =

$m1 \cdot \lambda 1/(n-1)$. Ohnishi does not disclose that the depth h02 of the grating groove of said second surface of the diffraction grating in the optical head device of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama is expressed by $h02 = m2 \cdot \lambda 2/(n-1)$ where n1 is the refractive index of said first diffraction grating, n2 is the refractive index of said second diffraction grating; $\lambda 1$ is the wavelength of said first light source; $\lambda 2$ is the wavelength of said second light source, and ml and m2 are natural numbers.

Katsuma discloses an optical head device comprising a first and second light source emitting light beams of different wavelength and a diffraction grating, which is provided on the optical path between a first light source (Fig. 6, element 1C) and an objective lens (Fig. 6, element 5) and on the optical path between a second light source (Fig. 6, element 1B) and the objective lens and which has a first-order diffraction efficiency of almost zero for the light beam from one of the said light sources and emits the first-order diffraction light for the light beam from the other said light source (Col. 2, lines 50-54). Katsuma further discloses that the diffraction grating has a groove depth h expressed by $h = m \cdot \lambda/(n-1)$ where n is the refractive index of said diffraction grating, λ is the wavelength of the light that is not diffracted, and m is a natural number (Col 2, lines 21-41). Katsuma teaches that a diffraction grating with a groove depth meeting the aforementioned expression will efficiently direct light beams of different wavelengths to their corresponding optical media (Col. 1, lines 12-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the groove depth of each of the first surface of Toyoda and the second surface of Ohnishi of the diffraction grating of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama meet the diffraction grating

groove depth expression suggested by Katsuma using the wavelength of the light beam that is not diffracted ($\lambda 1$ or $\lambda 2$) as the value for λ; the motivation being to have diffraction gratings that efficiently direct light beams of different wavelengths to their corresponding optical media. It is noted that the surface of the diffraction grating of Ohnishi (Fig. 10, element 2a), which is the second surface of the diffraction grating, does not diffract the second light beam (emitted from the second light source (Fig. 10, element 1b)) having the wavelength $\lambda 2$ (Fig. 10).

In regard to claim 9/7, the underlying material of Mori (Fig. 10) on which the surfaces (Fig. 10, elements 12 and 13) are integrally formed is interpreted as a substrate. Therefore, in the optical head device of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma, the first and second surfaces of the diffraction grating are formed integrally on a substrate.

4. Claims 8 and 9/8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma as applied to claim 7 above, and further in view of Shiono.

Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma discloses the optical head device as claimed in claims 7. Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma does not disclose that the natural numbers m1 and/or m2 are 1.

Shiono discloses diffraction gratings that meet the groove depth expressions of $m1 \cdot \lambda 1/(n-1)$ and $m2 \cdot \lambda 2/(n-1)$, wherein the natural numbers m1 and m2 are 1 (Col. 12, lines 61-62 and 64-65).

Shiono teaches that with these groove depths, the diffraction grating will have maximum first-order diffraction efficiency for the respective wavelength (Col. 12, lines 62-64 and 65-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the diffraction gratings with the groove depth expressions of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma with the natural numbers in the expressions equal to 1 as suggested by Shiono; the motivation being for each of the diffraction gratings to have a maximum first-order diffraction efficiency for the light of the wavelength to be diffracted.

In regard to claim 9/8, the underlying material of Mori (Fig. 10) on which the surfaces (Fig. 10, elements 12 and 13) are integrally formed is interpreted as a substrate. Therefore, in the optical head device of Takahashi in view of Toyoda and further in view of Ohnishi and further in view of Mori and further in view of Akiyama and further in view of Katsuma and further in view of Shiona, the first and second surfaces of the diffraction grating are formed integrally on a substrate.

Allowable Subject Matter

5. Claims 27-32 and 36-38 are allowable over the prior art of record.

Response to Arguments

6. Applicant's arguments with respect to claim 6-9, 19 and 39 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (703) 305-4534. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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